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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/760,741	01/17/2001	Jerry M. Brooks	M4065.0374/P374	5786

24998 7590 07/16/2003

DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L STREET NW
WASHINGTON, DC 20037-1526

EXAMINER

CHU, CHRIS C

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/760,741

Applicant(s)

BROOKS, JERRY M.

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4 - 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 - 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 30, 2003 has been entered. An action on the RCE follows.

2. Applicant's amendment filed on May 30, 2003 has been received and entered in the case.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2815

4. Claims 1, 4 ~ 7 and 10 ~ 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. in view of Noda.

Regarding claim 1, King et al. discloses in Fig. 1, Fig. 3, column 3, lines 52 ~ 53 and column 3, lines 65 ~ 67 a semiconductor assembly comprising:

- a support structure (18) having a top surface, wherein said support structure is a film;
and
- at least one semiconductor die (14D) having a perimeter, including four sides, and a top and bottom surface, said bottom surface having a smaller area than said top surface of said support structure, said at least one semiconductor die (14D) being secured at its bottom surface to said top surface of said support structure by a flowable adhesive material (22D) which does not extend past said perimeter of said at least one semiconductor die.

King et al. does not disclose the flowable adhesive material that does not extend past any one of the sides of said perimeter of said at least one semiconductor die. However, Noda teaches in Fig. 2 and Fig. 4 a flowable adhesive material (8) that does not extend past any one of the sides of a perimeter of at least one semiconductor die (3). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the flowable adhesive material to be not extend past any one of the sides of the perimeter of the semiconductor die as taught by Noda. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the purpose of providing a structure to have an easy replacement of an electronic part mounted on a printed circuit board (column 1, lines 46 ~ 48).

Regarding claim 4, King et al. discloses in Fig. 1 said support structure being at least one semiconductor die with a top and bottom surface.

Regarding claim 5, since King et al. does not limit an adhesive to be any specific or particular material, hence his/her disclosure encompasses all well known adhesive material's including "epoxy."

Regarding claim 6, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material (22D) covering an area less than or equal to about 90% of said at least one semiconductor die bottom surface area.

Regarding claim 7, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material covering an area greater than or equal to about 50% of said at least one semiconductor die bottom surface area.

Regarding claim 10, King et al. discloses in Fig. 3 said at least one semiconductor die being in electrical communication (42) with at least one electrical contact area (36 and 38) provided on said support structure.

Regarding claim 11, King et al. discloses in column 4, lines 48 ~ 67 said electrical communication being through a wire bond (50).

Regarding claim 12, King et al. discloses in Fig. 3 said at least one electrical contact area being a bonding pad (30D).

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. and Noda as applied to claim 1 above, and further in view of Ball.

Art Unit: 2815

Regarding claims 8 and 9, King et al. discloses the claimed invention except for a distance between an electrical contact area and said perimeter of said at least one semiconductor die is less than or equal to about 200 microns. However, Ball teaches in Fig. 2 a distance between an electrical contact area and a perimeter of at least one semiconductor die being less than or equal to about 200 microns. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify King et al. by using the distance being less than or equal to about 200 microns as taught by Ball. The ordinary artisan would have been motivated to further modify King et al. in the manner described above for at least the purpose of decreasing a size of the package.

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. and Noda as applied to claim 1 and 10 above, and further in view of Fukui et al.

Regarding claim 13, King et al. discloses the claimed invention except for encapsulating material for encapsulating said die, electrical communication, and at least a portion of said support structure. However, Fukui et al. teaches in Fig. 1 encapsulating material (8) for encapsulating a die, an electrical communication, and at least a portion of a support structure. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the encapsulating material as taught by Fukui et al. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the purpose of protecting semiconductor devices.

Regarding claim 14, Fukui et al. discloses in Fig. 11(f) said encapsulating material fills (8) in at least some portion of a space between said bottom surface of said die and said top surface of said support structure.

7. Claims 15 ~ 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. in view of Lo et al., and further in view of Noda.

Regarding claim 15, King et al. discloses in Fig. 1 and column 3, lines 65 ~ 67 a semiconductor assembly comprising:

- a first semiconductor die (14D) having a top and a bottom surface;
- a second semiconductor die (14C) having a perimeter, including four sides, and a top and bottom surface, said second die being secured at its bottom surface to said top surface of said first semiconductor die by a flowable adhesive material (22C) which does not extend past a perimeter of said second semiconductor die.

King et al. does not disclose said bottom surface of a second semiconductor chip having a smaller area than said top surface of said first semiconductor die; wherein said top surface of said first semiconductor die has at least one electrical contact area positioned at a location exterior to said perimeter of said second semiconductor die; and wherein a distance between said electrical contact area and said perimeter of said second semiconductor die being less than or equal to about 428 microns. However, Lo et al. discloses in Fig. 1 and column 2, lines 31 ~ 58 a bottom surface of a second semiconductor chip (11) having a smaller area than a top surface of a first semiconductor die (12); a top surface of a first semiconductor die (12) having at least one electrical contact area (13) positioned at a location exterior to a perimeter of a second

Art Unit: 2815

semiconductor die (11); and wherein a distance (A) between said electrical contact area and the perimeter of the second semiconductor die is less than or equal to about 428 microns. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify King et al. by using the bottom surface of a second semiconductor chip and the distance and location of the electrical contact area as taught by Lo et al. The ordinary artisan would have been motivated to modify King et al. in the manner described above for at least the purpose of preventing a capillary from colliding with the chip during the three-dimensional package wiring process (column 1, lines 62 ~ 64).

Further, King et al. and Lo et al. do not disclose the flowable adhesive material that does not extend past any one of the sides of said perimeter of said at least one semiconductor die. However, Noda teaches in Fig. 2 and Fig. 4 a flowable adhesive material (8) that does not extend past any one of the sides of a perimeter of at least one semiconductor die (3). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to further modify King et al. by using the flowable adhesive material to be not extend past any one of the sides of the perimeter of the semiconductor die as taught by Noda. The ordinary artisan would have been motivated to further modify King et al. in the manner described above for at least the purpose of providing a structure to have an easy replacement of an electronic part mounted on a printed circuit board (column 1, lines 46 ~ 48).

Regarding claim 16, King et al. discloses in Fig. 1 said first semiconductor die (14D) being secured to a support structure (18).

Regarding claim 17, King et al. discloses in Fig. 1 and column 3, lines 52 and 53 said support structure (18) being a film.

Regarding claims 18, King et al. discloses in column 3, lines 52 and 53 said support structure being a printed circuit board.

Regarding claim 19, since King et al. does not limit an adhesive to be any specific or particular material, hence his/her disclosure encompasses all well known adhesive material's including "epoxy."

Regarding claim 20, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material (22D) covering an area less than or equal to about 90% of said at least one semiconductor die bottom surface area.

Regarding claim 21, King et al. discloses in Fig. 3 and column 3, lines 65 ~ 67 said flowable adhesive material covering an area greater than or equal to about 50% of said at least one semiconductor die bottom surface area.

Response to Arguments

8. Applicant's arguments with respect to claims 1 and 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

Art Unit: 2815

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
July 11, 2003

A handwritten signature in black ink, appearing to read 'Eddie Lee', is positioned above the printed name and title.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800